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Section 6.2 Covalent Bonding

(pages 165–169)

This section discusses the formation of covalent bonds and the factors that determine whether a molecule is polar or nonpolar. It also discusses attractions between molecules.

Reading Strategy (page 165)

Relating Text and Visuals As you read the section, look closely at Figure 9. Complete the table by describing each type of model shown. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Molecular Models	
Model	Description
Electron dot	
Structural formula	
Space-filling	
Electron cloud	

Covalent Bonds (pages 165–167)

- Describe a covalent bond.
- Circle the letters of molecular models that show orbitals of atoms overlapping when a covalent bond forms.
 - electron dot
 - structural formula
 - space-filling
 - electron cloud
- Describe a molecule.
- Is the following sentence true or false?

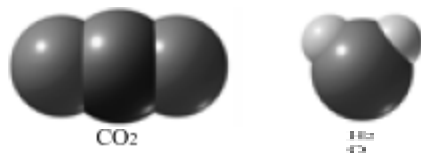
“In a covalent bond, the atoms are held together by the attractions between the shared electrons and the protons in each nucleus.”
- Circle the correct answer. Nitrogen has five valence electrons. How many pairs of electrons must two nitrogen atoms share in order for each atom to have eight valence electrons?
 - zero
 - one
 - two
 - three

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Unequal Sharing of Electrons (pages 167–168)

6. In general, elements at the _____ of a group have a greater attraction for electrons than elements at the _____ of a group have.
7. In a hydrogen chloride molecule, the shared electrons spend more time near the _____ atom than near the _____ atom.
8. Describe a polar covalent bond.
9. When atoms form a polar covalent bond, the atom with the greater attraction for electrons has a partial _____ charge.
10. Is the following sentence true or false?
“In a molecule of a compound, electrons are always shared equally by both atoms.”
11. Circle the letter of each factor that determines whether a molecule is polar or nonpolar.
- a. the number of atoms in the molecule
 - b. the type of atoms in the molecule
 - c. the number of bonds in the molecule
 - d. the shape of the molecule



12. Compare the shapes of carbon dioxide and water molecules. Circle the letter of the polar molecule.
- a. carbon dioxide
 - b. water
13. Is the following sentence true or false?
“In a water molecule, the hydrogen side of the molecule has a partial positive charge, and the oxygen side has a partial negative charge.”

Attraction Between Molecules (page 169)

14. Water has a higher boiling point than carbon dioxide because attractions between polar molecules are than attractions between non-polar molecules.
15. Is the following sentence true or false?
“Attractions among non-polar molecules explain why nitrogen can be stored as a liquid at low temperatures and high pressures.”